Repeated observation of interfamilial "mating" between males of the arctiid moth *Amata phegea* and females of the burnet moth *Zygaena filipendulae* (Lepidoptera: Arctiidae and Zyganeidae)

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Key words: visual discrimination, interspecific copulation, mate locating behaviour.

Wiederholte Beobachtung von Paarungen zwischen Männchen der Arctiide *Amata phegea* und Weibchen der Zygaenide *Zygaena filipendulae* (Lepidoptera: Arctiidae und Zyganeidae)

Zusammenfassung: In den Jahren 2005 und 2006 konnten insgesamt 3 interfamiliäre Paarungen zwischen Männchen von *Amata phegea* und Weibchen von *Zygaena filipendulae* beobachtet werden. Untersuchungsgebiet war die Umgebung der Stadt Ždánice in Südostmähren, Tschechische Republik, ca. 240 m. Die Beobachtungen werden mit anderen aus der Literatur verglichen, und über die möglichen Ursachen solcher Fehlpaarungen wird diskutiert.

Introduction and results

Records of interspecific pairing seem to be reported rather frequently in (European) Zygaenidae, but a majority of published records concern pairings within the genus *Zygaena* Fabricius, 1775, such as *Z. osterodensis* Reiss, 1921 with *Z. lonicerae* (Skala 1913), *Z. filipendulae* with *Z. viciae* (Young et al. 2007), *Z. purpuralis* (Brünnich, 1763) with *Z. filipendulae* (Brockmann 1982), and *Z. purpuralis* with *Z. ephialtes* (Janicke 1989). These observations are easily explicable as mate-recognition mistakes by the more active ♂ sex, because adults of a majority of *Zygaena* species share a similar red-and-black wing pattern (Naumann et al. 1999).

While conducting fieldwork in environs of the town Ždánice, SE Moravia, the Czech Republic (49°4' 48.967"N, 17°1'56.075"E, altitude 240 m), we observed three interspecific (and interfamilial) *in copula* pairs composed of ♂♂ of the day-active arctiid moth *Amata phegea* (Linnaeus, 1758) (Arctiidae) and ♀♀ of the burnet moth *Zygaena filipendulae* (Linnaeus, 1758) (Zygaenidae) (Figs. 1, 2). The observation dates were 3. vii. 2005, 7. vii. 2005 and 8. vii. 2006, always in early afternoon hours. Both said species were abundant at the locality and thousands of individuals of each of them were easily observed during a day in peak flight.

The locality (Fig. 3) is a steep valley with N–S orientation, adjoining farmland in the South and vast beech-dominated woodlands in the North. Its steep slopes originally contained a mosaic of orchards, gardens, meadows and small fields. In present, the farming practices are largely abandoned and the slopes are covered by a highly heterogeneous mosaic of both herbaceous and shrubby xeric vegetation. The valley hosts a high biotic diversity. We recorded 68 species of butterflies, representing almost a half of extant Czech butterfly fauna, from its 25 hectares in 2004–2007. Zygaenidae moths were recorded in 8 species: *Jordanita subsolana* (Staudinger, 1862), *Zygaena brizae* (Esper, 1800), *Z. ephialtes* (Linnaeus, 1767), *Z. filipendulae* (Linnaeus, 1758), *Z. lonicerae* (Scheven, 1777), *Z. loti* ([Denis & Schiffermüller], 1775), *Z. minos* ([Denis & Schiffermüller], 1775) and *Z. viciae* ([Denis & Schiffermüller], 1775).

Discussion

A case similar to the one described here was inter-familial pairing between ♀ *Z. filipendulae* and ♂ of the arctiid moth *Tyria jacobaeae* (Linnaeus, 1758), described by Williams (1914). Another rather bizarre case was observed by Tremewan (2005). It again concerned *Z. filipendulae* and *T. jacobaeae*, but the pairing was between two ♂♂. Even these interfamilial "pairings", however, are attributable to visual mate recognition mistakes, because *T. jacobae*, although much larger than *Z. filipendulae*, bears a black and red pattern distantly resembling the burnets.

The situation is slightly different in case of *A. phegea*, because both sexes of this species are black-and-white, whereas the mated ♀♀ are red-and-white, as in a majority of European *Zygaena*. A possible solution to this riddle might lay in the nature of chemical attractants. As found by field trapping experiments, *A. phegea* ♂♂ are attracted by at least two particular compounds, (Z,Z,Z)-3,6,9-Heneicosatriene (Szöcs et al. 1987) and cis-7,8-epoxy-2-methyloctadecane (= disparlure) (Capek 1979), which are both used as components of sexual pheromones by a wide spectrum of Lepidoptera from such families as Noctuidae, Geometridae and Lymantridae. So far, these particular compounds were not found in *Zygaena* (El-Sayed 2007), but burnet ♀♀ do use pheromones to attract ♂♂ (Naumann et al. 1999, Toshova et al. 2007). The very fact that ♂♂ of *A. phegea* approach non-specific attractants suggests a relatively low discrimination ability, at least from a distance. At a close proximity, the pairing decision may be affected by such cues as wing shape, which is very similar in *Amata* and *Zygaena*. Anyway, both species are usually so abundant at the locality that pairing errors are made easy.

These speculations notwithstanding, our observation of repeated attempts of interfamilial mating documents that courting and mating mistakes occur rather frequently in *Amata* ♂♂ and *Zygaena* ♀♀.

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Figs. 1, 2: *In copula* pair formed by ♂ arctiid *Amata phegea* and ♀ burnet moth *Zygaena filipendula*. Ždánice, Southern Moravia, Czech Republic, 3. VII. 2005. **Fig. 3:** The Ždánice locality: mosaic of managed and unmanaged xeric grasslands, scrub and abandoned orchards, hosting exceptionally high diversity of butterflies and burnet moths.

Acknowledgements

We acknowledge financial support by the Czech ministry of education (6007665801, LC6073).

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Received: 7. VIII. 2008, 25. VIII. 2008

© Entomologischer Verein Apollo e. V., Frankfurt am Main, Juni 2009

ISSN 0723-9912

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